

MANUAL PART NUMBER: 400-0049-003 PRODUCT REVISION: 0

VA6831FC

DUAL INPUT/SWITCHABLE ANALOG INTERFACE USER'S GUIDE





INTRODUCTION

Thank you for purchasing the **VA6831FC** Dual Input/Switchable Analog Interface. We are sure you will find it reliable and simple to use.

Superior performance for the right price, backed by solid technical and customer support is what Altinex has to offer.

The product you are holding in your hands is designed using state-of-the-art technology and is superior to anything available on the market. You will find this and our other products reliable, long lasting, and simple to operate.

We are committed to providing our customers with signal management solutions to the most demanding audio-visual installations at very competitive pricing.

We appreciate your selection of our products and are confident that you will join the ranks of our many satisfied customers throughout the world.

This manual covers:

VA6831FC – Dual Input/Switchable Analog Interface

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PRECAUTIONS / SAFETY WARNINGS

Please read this manual carefully before using your VA6831FC Interface. Keep this manual handy for future reference. These safety instructions are to ensure the long life of your VA6831FC and to prevent fire and shock hazard. Please read them carefully and heed all warnings.

1.1 GENERAL

- Unauthorized personnel shall not open the unit since there are high-voltage components inside.
- Qualified Altinex service personnel, or their authorized representatives must perform all service.

1.2. SAFETY GUIDELINES FOR THE RACK-MOUNTING OF THE VA6831FC

- Maximum operating ambient temperature is 35 (degrees C).
- Never restrict the airflow through the devices' fan or vents.
- When installing equipment into a rack, distribute the units evenly. Otherwise, hazardous conditions may be created by an uneven weight distribution.
- Connect the unit to a properly rated supply circuit.
- Reliable Earthing (Grounding) of Rack-Mounted Equipment should be maintained.

1.3 INSTALLATION

- For best results, place the VA6831FC Interface on a flat, level surface in a dry area away from dust and moisture.
- To prevent fire or shock, do not expose this unit to rain or moisture. Do not place the VA6831FC Interface in direct sunlight, near heaters or heat radiating appliances, or near any liquid. Exposure to direct sunlight, smoke, or steam can harm internal components.
- Handle the VA6831FC Interface carefully. Dropping or jarring can damage internal components.
- Do not place heavy objects on top of the VA6831FC. If the VA6831FC is to be mounted to a table or wall, use only Altinex made mounting accessories, such as brackets

- (DA1293FC or DA1294FC) and cables for optimum setup.
- To turn off the main power, be sure to remove the cord from the power outlet. The power outlet socket should be installed as close to the equipment as possible, and should be easily accessible.
- Do not pull the power cord or any cable that is attached to the VA6831FC Interface.
- If the VA6831FC Interface is not used for an extended period, disconnect the power cord from the power outlet.

1.4 CLEANING

 Unplug the VA6831FC power cord before cleaning. Clean surfaces with a dry cloth. Never use strong detergents or solvents, such as alcohol or thinner. Do not use a wet cloth or water to clean the unit.

1.5 FCC / CE NOTICE

- This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
- This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
- Any changes or modifications to the unit not expressly approved by Altinex, Inc. could void the user's authority to operate the equipment.



ABOUT YOUR INTERFACE

There are several varieties of computers and computer video cards on the market today. There are also numerous data monitors and large screen data projectors. When displaying a computer image on a large screen data projector or on a large screen monitor, it often becomes clear that some computers are not always compatible with these display devices. The **VA6831FC** is a computer video interface designed to resolve this incompatibility.

The VA6831FC is a dual input-switchable computer video interface. It is designed to interface up to two VGA, SVGA, XGA, UXGA, MAC, SUN, or SGI computer video sources to one scan-rate compatible presentation monitor or data projector. Each of the inputs can be connected to different types of computers simultaneously. The VA6831FC will amplify video signals and convert the sync portion of the signal to the desired format.

It is important to understand the general capabilities of interfaces. Interfaces <u>do not change</u> the scan-rate or the resolution of the video signal. An interface simply converts a computer video signal to a pre-selected analog format. The source (computer) and display (projector or monitor) must be scan-rate compatible.

The **VA6831FC** is a state-of-the-art piece of equipment with an exceptional combination of advanced features and very competitive pricing.

TECHNICAL SPECIFICATIONS

FEATURES/DESCRIPTION	VA6831FC
GENERAL	VAGGOTTO
No. of Inputs	2 Audio Inputs + 2
	Video Inputs
Computer Input Connector	Two, 15pin HD Female
Stereo Audio Input	Two, 5 position
Connector	Terminal Blocks
No. of Outputs	2 Local Monitor Output
	+ Main Video Output +
	Stereo Audio Output
Local Monitor Output	Two, 15-pin HD
Connector	Female
Main Video Output	One, 6 BNC
Connector	

Stereo Audio Output	One, 3 position
Connector	Terminal Block
Compatibility	VGA/
	SVGA/XGA/UXGA
	Compatible Signals,
	Apple/MACII/Quadra/G
	3 Signals, Sun/SGI
	Workstations

Table 1. VA6831FC General

MECHANICAL	VA6831FC
Width (inches)	8.50in (216mm)
Height (inches)	1.75in (44mm)
Depth (inches)	4.93in (125mm)
Weight (pounds)	2.0lbs (0.91kg)
Ship Weight (pounds)	2.8lbs (1.27kg)
Material	0.1" Aluminum
Finish	Gray
Faceplate	Lexan
T° Operating	10°C-35°C
T° Maximum	50°C
Humidity Technical	90% non-condensing
MTBF (calculations)	40,000hrs

Table 2. VA6831FC Mechanical

ELECTRICAL	VA6831FC
Input Video Signals	
Analog Signal	0.3 to 1.2 Volt p-p
Impedance	75 Ohms
Input Sync Signals	
Horizontal, Vertical, & C-Sync	TTL(+/-)
Sync on Green	-0.3V
Impedance	10 k Ohms
Audio Input Signals	
Type	Differential
CMRR	>80dB @ 10 Hz to 20
	kHz
Impedance	10 k Ohms
Voltage	10 V p-p, +/-5 Volts
Output Video Signals	
Analog Signal	0.77 V p-p
Impedance	75 Ohms
Output Sync Signals	
Composite Sync	TTL(+/-)
Sync on Green	-0.3V
Impedance	22 Ohms
Audio Output Signals	
Туре	Single Ended
Impedance	<22 Ohms (drives 600



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	Ohms)
Cross-talk	<80dB @ 1 kHz
Signal-to-Noise Ratio	>95dB
Bandwidth	10 Hz – 40 kHz
Stereo Channel Separation	>75dB @ 1 kHz,
	>60dB @ 20 kHz
Frequency Compatibility	
Horizontal	15-130 kHz
Vertical	25-180Hz
Minimum Video Bandwidth	350MHz
Horizontal Position Range	20%
Cross-talk	39dB @ 100MHz
Power	
Internal Power Supply	90-140/200-240 V
Power Consumption	12 watts max.

Table 3. VA6831FC Electrical

VA6831FC DESCRIPTION

4.1 COMPUTER VIDEO INPUT (VGA-COMPATIBLE 15-PIN HD CONNECTOR)

The two 15-pin HD inputs allow the connections of two computers to the interface using cables with a 15-pin HD connector on the interface end and a matching connector on the computer end. This 15-pin HD connector allows greater flexibility and versatility from the **VA6831FC.** All ID pins are passed through for proper boot up mode. Several computers like the PC, MAC, SUN, and SGI can be attached using the proper cables as described in Section 8 - Accessories.

PIN No.	INPUT SIGNALS ON 15-PIN HD FEMALE CONNECTOR
1	Red Video
2	Green Video
3	Blue Video
4	ID Bit (Connected to Ground when ID Bit switch is ON)
5	Ground
6	Ground
7	Ground
8	Ground
9	No connection
10	No connection
11	ID Bit
PIN	INPUT SIGNALS ON 15-PIN HD FEMALE
No.	CONNECTOR

12	ID Bit
13	Horizontal Sync/Composite Sync
14	Vertical Sync
15	No connection

Table 4. VA6831FC Dual Input pin-outs

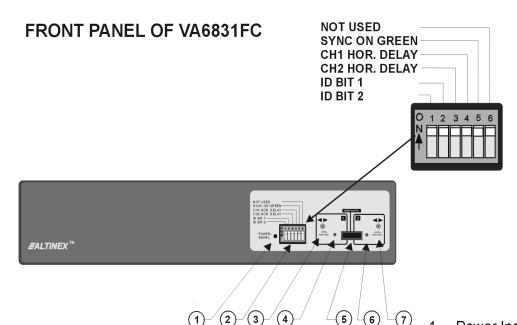
4.2 LOCAL MONITOR OUTPUT (15-PIN HD CONNECTOR)

Each of the inputs has a local monitor output through a 15-pin HD female connector. These outputs allow the connections of a local monitor up to 12 feet away from the interface.

These are fully buffered outputs, eliminating reflections often caused by "Y" type monitor breakout cables. It is not necessary to terminate the unused output. The output is VGA compatible, but can also be used to transmit signals to other types of local monitors using the provided Altinex adapter cables such as VGA, MAC, SUN, SGI, or RGB.

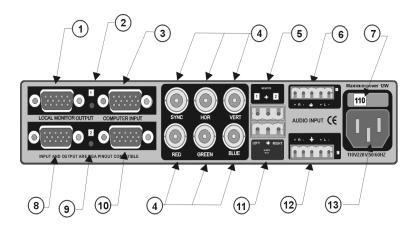
PIN No.	LOCAL MONITOR OUTPUT SIGNALS ON 15-PIN HD FEMALE CONNECTOR
1	Red Video
2	Green Video
3	Blue Video
4	ID Bit /Grounded when ID Bit switch is ON
5	Ground
6	Ground
7	Ground
8	Ground
9	Composite Sync
10	No connection
11	ID Bit
12	ID Bit
13	Horizontal Sync/Composite Sync
14	Vertical Sync
15	No connection

Table 5. Dual Local Monitor Outputs pin-out



- 1 Power Indicator
- 2 Dip switches
- 3 Horizontal Position Control (Input 1)
- 4 Input 1 Indicator LED
- 5 Input Select Switch/Auto Switch
- 6 Input 2 Indicator LED
- 7 Horizontal Position Control (Input 2)

BACK PANEL OF VA6831FC



- 1 Local Monitor Output No.1
- 2 Input 1 Selection Indicator LED
- 3 Computer Input No.1
- 4 6-BNC Main Output Connectors RGBSHV
- 5 Contact Closure Control Connector
- 6 Stereo Audio Input No.1
- 7 Fuse Box (allows setting for either 110V or 220V/Voltage Selection)
- 8 Local Monitor Output No.2
- 9 Input 2 Selection Indicator LED
- 10 Computer Input No.2
- 11 Stereo Audio Output
- 12 Stereo Audio Input No.2
- 13 Universal Connector for Power Cord





4.3 MAIN (RGBS/RGBHV) OUTPUT THROUGH 6 BNC CONNECTORS

BNC connectors offer a reliable connection for high-resolution video signals, and they facilitate easy cable maintenance in the field. The main output of the VA6831FC is configured with six BNC connectors. By selecting the appropriate combinations, these outputs can provide RGsB, RGBHV, or RGBS output signals. RGsB type input signals are passed through only because the VA6831FC does not separate SYNC from the Green signal. With these connectors, the VA6831FC can be connected to compatible projectors using 4-coax cable for RGBS signals or 5-coax cable for RGBHV signals.

CONNECTOR	OUTPUT SIGNALS (6-BNC FEMALE)
Red	Red Video
Green	Green Video
Blue	Blue Video
Sync	Composite Sync
Horizontal	Horizontal Sync
Vertical	Vertical Sync

Table 6. VA6831FC Main Output pin-outs

4.4 INPUT SELECTION SWITCH

The selection of inputs between one and two are accomplished by using the Input Select Switch on the front panel. This switch has three positions: left, center, and right.

By switching to the left, the unit will select INPUT 1. By switching to the right, the **VA6831FC** will select INPUT 2. The center position is a REMOTE/AUTO mode.

The LED lights on each side of the Input Select Switch will indicate which input is selected.

If only one source is present and the Input Select Switch is in the **VA6831FC's** AUTO mode, the unit will select the active input. An on LED will indicate the active input.

When two active sources are present and the Input Select Switch is on the REMOTE/AUTO position, the **VA6831FC** selects INPUT 2 as the default turning LED 2 red.

4.5 HORIZONTAL POSITION ADJUSTMENT

Most monitors and projectors have the ability to adjust the horizontal position of the image, but sometimes it is helpful to control this feature at the interface. This control is especially useful when multiple computers are switched to a single display if the Horizontal positions for each computer is slightly different.

The **VA6831FC** offers a horizontal position adjustment for each of the inputs. Turning the Horizontal Position Adjustment knob (blue color) located on each side of the INPUT SELECTION SWITCH will set the unit.

First, make sure that the CH1 Horizontal Delay and CH2 Horizontal Delay dip-switches are OFF.

With the interface Input Select Switch on REMOTE/AUTO (center position) and the Horizontal Position Control Switch centered, adjust the image using the monitor or projector's Horizontal image position control. Then set the Input Select Switch to the desired input and adjust the Horizontal position of the image on the display with the VA6831FC's Horizontal Position Control knob.

4.6 AUDIO

The VA6831FC accepts two balanced stereo audio inputs and offers one unbalanced stereo audio output. Please note that the audio signal will follow the video signal during switching, which means that in either manual selection or auto-switch mode, if Input 1 is active then both video and audio signals will be selected for this input.

4.7 BANDWIDTH

The minimum bandwidth of the **VA6831FC** is 350 MHz, and the typical bandwidth is 425 MHz. This high bandwidth allows the passing of a video signal's third harmonic, thus ensuring a clean video signal. Indeed, the **VA6831FC** will be virtually transparent to the video signal.



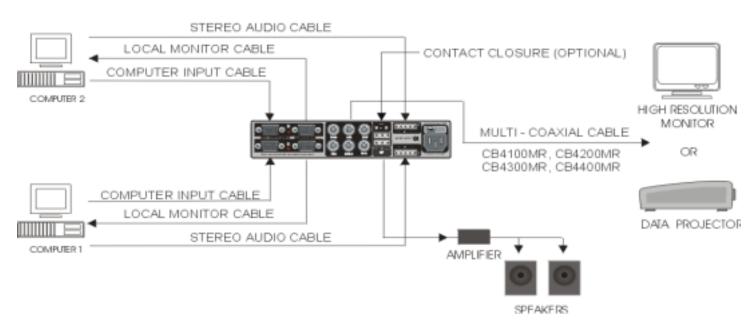
4.8 MOUNTING CAPABILITY

The VA6831FC can be easily mounted into an equipment rack. Four mounting holes are provided on each side of the unit. To mount a single unit, use Altinex 19"-1U Rack Mount Ears (part # DA1294FC). To mount two units in tandem, use an Altinex 19"-1U Rack Mount Shelf (part # DA1293FC). For under the table mounts, optional brackets, such as TM1271, TM1272, TM1273, or TM1274 can be used.

APPLICATION DIAGRAM

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SOURCE INTERFACE DISPLAY



INSTALLING YOUR INTERFACE

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- Step 1. Please attach the Interface on the rack using the provided rack mount hardware or using the optional TM Series Altinex mounting brackets, through two screens on each side of the VA6831FC.
- Step 2. The VA6831FC may be used with either 110V or 220V and offers a universal connector for ease of use throughout the world. Before plugging in the power cord to the unit, please verify that the voltage rating of 110V/220V on the

FUSE CLIP located on the rear of the VA6831FC is the same as the voltage rating on the power outlet. To change the setting, unplug the VA6831FC, squeeze the clips on either side of the fuse box, and pull out the fuse holder. Then turn the Fuse Dip 180 degrees, resetting it with the proper voltage shown through the window. Please reinsert the fuse box. The side clips of the fuse box should lock securely into place.

Step 3. Connect the power cord, pushing it in gently but firmly. The power indicator



light on the front panel of the **VA6831FC** should turn on.

- Step 4. Connect one end of the input cable to the video output of the computer and the other end to the 15-pin HD input connector of the VA6831FC. Repeat this step if two computers are to be interfaced.
- Step 5. Connect a cable from a local monitor to the 15-pin HD Local Monitor Output connector of the interface. Repeat this step for a second local monitor if two computers are to be interfaced. It is not necessary to terminate this output with a termination plug if a local monitor is not attached.
- Step 6. Connect one end of an output cable to the main output's BNC connectors of the VA6831FC. Connect the other end to the RGB input on the projector, or presentation monitor. One can use either a 4 BNC or 5 BNC coaxial cable depending on whether the system is designed as RGBS or RGBHV. Please note that if the projector has a 15-pin HD connector, five BNC to 15-pin HD cables (part # MS8102CA) are available from Altinex.
- **Step 7.** Make sure that the dip-switches are properly set according to Section 7.
- **Step 8.** Please adjust the Horizontal position of the image as described in Section 4.5.

If your computer and display device are turned on and you see a good clear image, you have successfully interfaced your computer with the video display.

CONGRATULATIONS! YOU ARE DONE.

If you experience any problems, please call 1-800-258- 4623 or 1-714-990-2300 for international calls.

OPERATION

The settings of the **VA6831FC** Interface can be adjusted using the dip-switches in Table 4. There are no other adjustments necessary to operate the unit. The **VA6831FC** will operate successfully as long as the cables are attached properly and technical specifications are followed.

DIP SWITCH	OFF	ON
Not Used	Х	
Sync on Green	Х	
Ch1 Horizontal Delay	X	
Ch2 Horizontal Delay	Х	
ID Bit 1	X	
ID Bit 2	X	

Table 7. Dip-switch default settings

7.1 SYNC ON GREEN OUTPUT SWITCH

Often systems that use large matrix switchers are designed to switch signals in RGsB format. In these types of systems, the ability of the VA6831FC to output the Sync signal on the Green signal can be very useful. It is important to know that the VA6831FC will not separate Sync from the Green signal if the input is RGsB. It will simply amplify the RGsB and pass it through. It will combine the Sync signal with the Green Video signal when the Sync on Green dip-switch is in the ON position, regardless of whether the input sync is RGBS or RGBHV. If the desired output is RGBS or RGBHV, then leave the Sync on Green dip-switch in the OFF position.

7.2 HORIZONTAL DELAY REMOVAL (CH1 & CH2)

The VA6831FC offers the ability to bypass horizontal delay. This may be necessary when interfacing with projectors or monitors with sensitive sync inputs, particularly with LCD projectors. By setting the appropriate dip switch for Input 1 or Output 2 to the ON position, the VA6831FC will output the same type of Sync signal as is being fed into it from the source. In this setting, Horizontal position control of the VA6831FC is disabled and any adjustments to the image position must be done at the monitor or projector. If the CH1 Horizontal Delay dipswitch is in the OFF position, then the horizontal

position of the image can be adjusted through the Horizontal Position Control knob located on the front panel. Similarly, one can only adjust the position of the image on the display for Input 2 using the Horizontal position control knob when the CH2 Horizontal Delay switch is in the OFF position.

7.3 I.D. BIT SWITCH 1& 2

Many computers use ID Bits or "Sense Pins" to recognize that a monitor has been connected to its video output port. Often, these ID Bits will allow the computer to recognize what type of monitor is connected in terms of its scan rate compatibility. When the ID Bit switch is in the ON position, the **VA6831FC** allows the main ID Bit (pin 4 on the input connector) to be connected to the Ground signal.

This is used primarily when interfacing laptop computers to imitate the presence of a local monitor. Typically, this recognition will take place during the boot up stage. If your Interface does not output video on the display, then place this switch in the ON position and reboot the computer. When left in the OFF position, this ID Bit will be passed through to the local monitor output port.

ACCESSORIES 8

Model No.	Description
	RACK MOUNT ACCESSORIES
DA1293SX	Rack/Wall Shelf fits two VA6831FC
	units side by side
DA1294SX	Rack/Wall mount ears for single
	VA6831FC
	TABLE MOUNT BRACKETS
TM1271	1U High, 1/2 Rack-Wide
TM1272	1U High, ½ Rack-Wide with 15-pin
	HD connector plate
TM1273	1U High, ½ Rack-Wide with snap-in
	connectors
TM1274	1U High, ½ Rack-Wide with snap-in &
	POWER connectors

Input cable Local Monitor Cables and Output
Cables must be ordered separately from following
list

Model No.	Description		
	INPUT/LOCAL MONITOR CABLES		
MS8121CA	MAC Local Monitor Cable		
MS8122CA	MAC Input Cable		
MS8123CA	SUN/SGI Local Monitor Cable		
MS8124CA	SUN/SGI Input Cable		
MS8125CA	VGA Local Monitor Cable		
MS8126CA	VGA Input Cable		
MS8129CA	5 BNC Input/Local Monitor Cable		
	4 BNC TO 4 BNC COAXIAL CABLE		
CB4103MR	3 feet, 4 BNC to 4 BNC coaxial cable		
CB4106MR	6 feet, 4 BNC to 4 BNC coaxial cable		
CB4112MR	12 feet, 4 BNC to 4 BNC coaxial		
	cable		
CB4125MR	25 feet, 4 BNC to 4 BNC coaxial		
	cable		
CB4150MR	50 feet, 4 BNC to 4 BNC coaxial		
	cable		
CB4175MR	75 feet, 4 BNC to 4 BNC coaxial		
001110000	cable		
CB41100MR	1		
0044450110	cable		
CB41150MR	•		
	cable		
CD 4202MD	5 BNC TO 5 BNC COAXIAL CABLE		
CB4203MR	3 feet, 5 BNC to 5 BNC coaxial cable		
CB4206MR	6 feet, 5 BNC to 5 BNC coaxial cable		
CB4212MR	12 feet, 5 BNC to 5 BNC coaxial cable		
CB4225MR	25 feet, 5 BNC to 5 BNC coaxial		
CD4223IVIR	cable		
CB4250MR	50 feet, 5 BNC to 5 BNC coaxial		
ODTZJUNIK	cable		
CB4275MR	75 feet, 5 BNC to 5 BNC coaxial		
03.2.0	cable		
CB42100MR	100 feet, 5 BNC to 5 BNC coaxial		
	cable		
CB42150MR	150 feet, 5 BNC to 5 BNC coaxial		
	cable		

All **MS81** Series cables listed above are 3 ft. long. These cables are available in 6 ft. and 12 ft. lengths. Please call 1-714-990-2300 for a wider selection of cables.

FAQ (FREQUENTLY ASKED QUESTIONS) 9

No:	Question	Answer
1.	When and why do I need to use the Horizontal Position Adjustment knob?	If you have multiple computers connected to a single display through the VA6831FC, this control will be useful to adjust the horizontal position of the image for each input. This control knob is only active when CH1 Horizontal Delay & CH2 Horizontal Delay dipswitches are in the OFF position for each input.
2.	When and why would I use the SYNC ON GREEN dipswitch, although the unit does not separate SYNC from GREEN?	The VA6831FC does not separate the SYNC signal from GREEN. It will combine Sync with Green Video, when the SYNC ON GREEN switch is in the ON position. So, if the desired output is in RGsB format, then put this dip-switch in the ON position.
3.	What is Horizontal Delay and why is this function needed?	This function may be necessary when interfacing with a projector/monitor with sensitive sync input, or particularly with LCD projectors. When the Horizontal Delay is in the ON position, the output will have the same type of Sync as the source.
4.	Why do we have balanced input and unbalanced output?	If you use the VA6831FC for a distance of less than 500 ft with an output cable, there is no need to have balanced input and balanced output. If balanced audio input is fed into the VA6831FC Interface, the unbalanced audio output will provide a good signal quality.

TROUBLESHOOTING GUIDE

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- 1. The power LED should be ON, when the correct voltage is applied to the Interface.
- 2. Make sure that the cables have the correct pinouts and the connection and quality of the cables are good.
- 3. Make sure that the source and display are scan-rate compatible. The projector or monitor should support an appropriate signal format (RGsB, RGBS or RGBHV). Connect a projector or monitor directly to the computer with a shorter cable to verify the compatibility of the display and source.
- 4. When adjusting the Horizontal position of the image, check to see if the CH1 Horizontal Delay or the CH2 Horizontal Delay switch is in the OFF position.
- 5. Verify that the position of the INPUT SELECTION SWITCH is in the proper position.
- 6. Please check the status of the LED next to the Input Selection switch on the front panel and make sure that it is ON for the active input.

ALTINEX POLICY

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11.1 LIMITED WARRANTY

Altinex warrants that its products and cables are free from defects in materials under normal use and service. This warranty is limited to repairing at company's factory any part or parts of the product, which upon company's examination shall disclose to be, thus defective. Products considered defective should be returned to company with transportation charges pre-paid within 2 years (90 days for cables) from date of shipment to the purchaser. The warranty is expressly instead of all other warranties expressed or implied. Altinex neither assumes nor authorizes any other person to assume for it any other liability concerning the sale of the products. This warranty shall not apply to any product that shall have been repaired or altered outside of company's factory in any way so as, in its judgment, to affect its stability or reliability, or that has been subject to misuse, negligence or accident.

11.2 RETURN POLICY

It is very important to Altinex that you receive the products that you have ordered and that this product fulfills your need. In the unlikely event, that an Altinex product needs to be returned please follow the policies below:

Altinex will accept product returns for a period of 30 days from authorized Altinex dealers. Products should be returned in an unopened package.

If the product has been opened, the restocking fees will apply. For the restocking fee amount, please contact an Altinex Sales Representative.

If the product is in your possession for more than 30 days, the restocking fees will apply.

Altinex will not accept any returns on cables or custom products.

If your product is in warranty and needs service, contact the Altinex Sales Department for an RMA (Return Material Authorization). Products returned without an RMA number may experience a delay in service.

If your product is out of warranty and needs service, contact the Altinex Sales Department for an RMA (Return Material Authorization). Products returned without an RMA number may experience a delay in service. The service charges will be quoted to you before actual repairs are done.

11.3 CONTACT INFORMATION

Sales Department

Phone: 714-990-2300 Fax: 714-990-3303

Accounting Department

Phone: 714-990-6088 Fax: 714-990-5778

